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BRIDGE STREET BRIDGE CONCEPTUAL ALTERNATIVES – 10/14/19

The Alternatives Analysis process examines the ability of each alternative to meet the Purpose and Need of the proposed project; while still taking practicable measures to avoid, minimize, and mitigate potential impacts to the built and natural environment. This process involves the development and evaluation of specific impact criteria that is essential to the decision-making process and the selection of a Preliminary Preferred Alternative. Descriptions of these alternatives, as well as a No Build, are provided below.

No Build

The No Build Alternative serves as the benchmark to measure the costs and benefits of each build alternative evaluated. This alternative assumes that no improvements would be made to upgrade the existing structure; however, maintenance and minor rehabilitation of the existing bridge would be completed to preserve the structural integrity and extend its useful life. Work to be performed includes repairing or replacing severely deteriorated structural members, repairing holes and unsound concrete in the south sidewalk, repairing the deteriorated concrete in the south fascia beam, and minor repairs to the mechanical and electrical systems.

This Alternative does not address the overall serious condition and structural deficiencies of the existing bridge. The bridge was built in 1913 and is over 100 years old. The bridge is in overall poor condition and is rated as Structurally Deficient based on the 2014 Bridge Re-evaluation Report. The bridge has a Sufficiency Rating of 48.5. The superstructure is in poor condition (Rating of 4 out of 10) due to the localized advanced material losses to the steel truss members above and below deck level, localized advanced material losses to the end floor beams and girders in the approach spans and holed through truss connection gusset plates in the swing spans. The structure has deteriorated to the point that it requires major rehabilitation or replacement.

Visual inspection of the bridge machinery indicates that much of the machinery is in fair condition and may be continued to be used with minimal maintenance and repair. The most pressing repairs are the end lift and span lock system. Electrically, much of the equipment is nearing the end of its service life. To provide additional long-term service life for the bridge, a long-term rehabilitation or replacement is required. The bridge has frequently been stuck in the open or closed position resulting delays to traffic.

The No Build option does not correct any of the controlling substandard design elements or improve safety at the Bridge Street and Passaic Avenue intersection. Bicycle compatibility and connectivity to adjacent roadways is also not provided under this Alternative.

Since there are no changes to the project site under this alternative, there are very few impacts, other than the minor impacts when the bridge is eventually demolished and removed.

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MAJOR REHABILITATION

Upon review of the 14th Cycle Bridge Re-Evaluation Survey Report,, the existing Bridge Street Bridge is in poor overall condition and is structurally deficient and functionally obsolete. The superstructure is in poor condition (Rating of 4 out of 10) due to the localized advanced material losses to the steel truss members above and below deck level, localized advanced material losses to the end floor beams and girders in the approach spans and holed through truss connection gusset plates in the swing spans. The substructure is in satisfactory condition. The bridge does not meet current seismic design standards. The overall condition of the mechanical drive machinery is fair; however there is only one set of brakes and the span lock machinery has failed. The bridge electrical system is in overall poor condition with much of the equipment nearing the end of its service life. These factors have rendered the bridge structurally deficient and is in need of major rehabilitation or replacement.

Based the condition of the superstructure, complete bridge deck replacement is needed along with extensive repairs to the over 100-year old large swing style truss system to address the structurally deficiencies of the existing bridge and to extend the service life of the bridge for at least 75 years. Rehabilitation work for the trusses includes replacement and/or strengthening of steel members by post tensioning methods and sand blasting and painting overhead and under-deck members. There are at least 10 floorbeams that have experienced cracking that are in need of replacement. Repairs to gusset plates, bearing stiffeners and the lower truss chords are also required. The stringers and open grid deck are in satisfactory condition and not in critical need of replacement at this time, however, to avoid having to replace both elements in a future contract, it will be more cost effective and efficient to replace with the extensive rehabilitation. In addition, stringers and deck sections need to be removed to address the floorbeam replacements. The deck replacement will include new deck joints and new parapets and bridge railings meeting current standards.

Based on the condition of the substructure, spall and crack repairs are needed. To bring the bridge to current AASHTO design standards including seismic code and scour protection, seismic retrofit of the center pivot pier is required and requires the installation of new foundation members, most likely drilled shafts, around the perimeter of the existing pier and structurally tying to the existing pier. Scour countermeasures are needed for the abutments and piers. The existing fender is in fair condition and repairing the fender system was considered however sections of the fender will need to be removed to allow for the seismic retrofit of the piers and it is unlikely that the existing timber, now over 40 years old, would last the life of the rehabilitation. As a result a new fender system will be required.

Based on the Electrical Inspection, complete replacement of the bridge electrical system is required to extend the service life of the bridge operation for at least 75 years. Complete electrical system replacement includes a new PLC based control system and current generation of inverter drives. The span motors should be replaced with new motors with thrustor type brakes that induce less stress on the operating machinery. Complete span position instrumentation and feedback should be provided as per the current requirements of AASHTO. The traffic control devices should be replaced, and provision for single operator control of the gates from the span control room should be accommodated. This will require the installation of a CCTV system to allow proper operator view of the approach roadway and pedestrian lanes. New power distribution equipment should be provided, including a new stand by generator, and new submarine cables provide for power and control. New lighting facilities should be provided as well.

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Based on the Mechanical Inspection, major rehabilitation of the bridge mechanical system is required to extend the service life of the bridge operation for at least 75 years. The mechanical work includes re-furbishing the center bearing assemblies, complete replacement of turning and end lift machinery, span locks, primary gearbox, motors and brakes. The center bearing retrofit requires the bridge to be jacked and the roller bearings replaced systematically.

Staged construction for a major rehabilitation of the bridge is not possible due to the existing bridge type (through truss swing movable span) resulting in the need for a temporary bridge on an alignment upstream or downstream of the existing bridge to maintain traffic during construction or the implementation of a detour.

The Major Rehabilitation alternative does not correct any of the controlling substandard design elements. Bicycle compatibility and connectivity to adjacent roadways cannot not be provided as the truss system does not allow for the structure to be widened with rehabilitation, so the existing curb to curb width of approximately 39 feet would remain.

MODIFIED REHABILITATION

The Bridge Street Bridge is eligible for listing on the National Register of Historic Places It was determined eligible for National Register listing by the New Jersey Historic Preservation Office (NJHPO) under Criterion C as an excellent example of a rim-bearing Pratt through truss swing span bridge.

Portions of the existing superstructure, substructure and machinery contribute to the bridge's significance including the Pratt through truss swing span, the east and west approach span steel fascia girders, the sidewalk support system, and the center pier and the east and west rest piers. In keeping with the ***Secretary of the Interior's Standards for the Treatment of Historic Properties-Rehabilitation***, a Modified Rehabilitation Alternative will be considered which would protect and preserve the historic fabric of the bridge to the greatest extent possible in retaining and repairing contributing and non-contributing elements; or replacing elements in kind with compatible materials, if feasible.

Consultation with the NJHPO is ongoing to determine whether the Modified Rehabilitation Alternative can meet the Secretary of Interior's Standards.

BRIDGE REPLACEMENT CONCEPTS

For the development of all conceptual bridge replacement alternatives, the following information was used:

- Results of the Navigation Impact Report completed for the Clay Street, Bridge Street and Kingsland Avenue Bridges over the Passaic River in October 2016, the following vertical clearances were developed for the low-level fixed bridge alternatives:
    - 12-foot vertical clearance over mean high water (highest clearance that can be achieved without impacts to the adjacent McCarter Highway and Passaic Avenue signalized intersections
    - 16-foot vertical clearance over mean high water (can accommodate the Passaic Valley Sewerage Commission skimmer vessels but not the Newark Fire Boats)

  - 18-foot vertical clearance over mean high water (can accommodate the Passaic Valley Sewerage Commission skimmer vessels and the Newark Fire Boats)
- High-level fixed bridge alternatives that were developed include the following
  - 35-foot vertical clearance over mean high water (the vertical clearance of the upstream I-280 Stickel Bridge over the Passaic River in the closed position)
  - 135-foot vertical clearance over mean high water (the vertical clearance of the upstream I-280 Stickel Bridge over the Passaic River in the open position)
- The existing bridge has an 7-foot vertical clearance above mean high water in the closed position.
- Two (2) eastbound lanes and two (2) westbound lanes for the new bridge are justified by the traffic analyses completed for the Design Year 2045 AM and PM Peak Hours.

Concept 1 – Bridge on Existing Alignment, Fixed Bridge with 12-Foot Vertical Clearance

Concept 1 includes widening and replacement of the Bridge Street Bridge along the existing alignment. The total bridge length is approximately 400 feet. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

This low-level fixed bridge option proposes to raise the profile of the existing Bridge Street Bridge by 6 feet to provide 12 feet of vertical clearance over the Passaic River and accommodate a proposed structure depth of 7 feet. This option assumes that one (1) 80-foot wide waterway channel will be provided on the Passaic River. The maximum grade provided on the roadway approaches to the bridge is 6%. 12 feet is the highest vertical clearance that can be provided over the river that does not result in major impacts to the Bridge Street/McCarter Highway and Bridge Street/Passaic Avenue signalized intersections. The proposed profile will impact the McCarter Highway and Passaic Avenue intersections by less than 3 inches.

West of the river, minor ROW impacts are anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. East of the river, minor ROW impacts are anticipated at the Speedway gas station as well as the proposed apartment/condominium property (1 Harrison Ave) on the south side of Harrison Avenue. A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

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Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

Concept 2 – Bridge on Existing Alignment, Fixed Bridge with 16-Foot Vertical Clearance

Concept 2 is very similar to Concept 1 except that the fixed bridge will provide 16 feet of vertical clearance over the Passaic River. The total bridge length is approximately 500 feet. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

This low-level fixed bridge option proposes to raise the profile of the existing Bridge Street Bridge by 10 feet to provide 16 feet of vertical clearance over the Passaic River and accommodate a proposed structure depth of 7 feet. This option assumes that one (1) 80-foot wide waterway channel will be provided on the Passaic River. The maximum grade provided on the approach roadways is 6%. The proposed profile will have a major impact on the McCarter Highway/Bridge Street intersection, as the roadway profile at that location will be more than 2 feet higher than the existing intersection. Impacts are also anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. Similarly, the profile raise at the Passaic Avenue/Bridge Street intersection is anticipated to be approximately 2 feet. This option would result in impacts to the Speedway gas station, the Dunkin Donuts/Popeye's strip mall, the proposed apartment/condominium property (1 Harrison Ave), as well as adjacent properties along Bridge Street east of Passaic Avenue. A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

Concept 3 – Bridge on Existing Alignment, Fixed Bridge with 18-Foot Vertical Clearance

Concept 3 is very similar to Concepts 1 and 2 except that the fixed bridge will provide 18 feet of vertical clearance over the Passaic River. The total bridge length is approximately 600 feet. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

This low-level fixed bridge option proposes to raise the profile of the existing Bridge Street Bridge by 12 feet to provide 18 feet of vertical clearance over the Passaic River and accommodate a proposed structure depth of 7 feet. This option assumes that one (1) 80-foot wide waterway channel will be provided on the Passaic River. The maximum grade provided on the approach roadways is 6% to try to minimize adjacent impacts. The proposed profile will have a major impact on the McCarter Highway/Bridge Street intersection, as the roadway profile at that location will be approximately 3 feet higher than the existing intersection. Impacts are also anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. Similarly, the roadway profile at the Passaic Avenue/Bridge Street intersection is anticipated to be more than 2 feet. This option would result in impacts to the Speedway gas station, the Dunkin Donuts/Popeye's strip mall, the proposed apartment/condominium property (1 Harrison Ave), as well as adjacent properties along Bridge Street east of Passaic Avenue. A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Concept 4 – Bridge on Existing Alignment, Fixed Bridge with 35-Foot Vertical Clearance

Concept 4 proposes a high-level fixed span bridge with a vertical clearance of 35 feet over the Passaic River. The total bridge length is approximately 1200 feet. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The 35-foot vertical clearance is the same clearance provided by the adjacent William A. Stickel Memorial Bridge on I-280 in its closed position. This concept involves raising the profile of the bridge by approximately 29 feet. The proposed profile indicates that on the western side, the bridge would tie down approximately 200 feet west of the McCarter Highway and Bridge Street intersection, between McCarter Highway and Atlantic Street. On the eastern side, the bridge would tie down approximately 350 feet east

of the Bridge Street and Passaic Avenue intersection, between Passaic Avenue and S. 1st Street. Due to the proposed profile raise, this concept would result in significant impacts to the Bridge Street intersections with McCarter Highway and Passaic Avenue along with the properties adjacent to Bridge Street.

Concept 5 – Bridge on Existing Alignment, Fixed Bridge with 135-Foot Vertical Clearance

Concept 4 proposes a high-level fixed span bridge with a vertical clearance of 135 feet over the Passaic River. The total bridge length is approximately 3200 feet. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The 135-foot vertical clearance is the same clearance provided by the adjacent William A. Stickel Memorial Bridge on I-280 in its open position. This concept involves raising the profile of the bridge by approximately 129 feet. The proposed profile indicates that on the western side, the bridge would tie down more than 400 feet west of the Broad Street intersection, after Bridge Street turns into Washington Street. On the eastern side, the bridge would tie down approximately 1800 feet east of the Bridge Street and Passaic Avenue intersection, east of the I-280 interchange in the vicinity of N. 3rd Street. The proposed profile raise would result in significant impacts to numerous intersection and properties along Bridge Street/Harrison Avenue and Washington Street. This concept would also result in impacts to I-280 and the railroad tracks that run parallel to I-280 on the south side.

Concept 6A – Bridge on Existing Alignment, Movable Bridge with One (1) 80-Foot Waterway Channel

Concept 6A includes widening and replacement of the Bridge Street Bridge along the existing alignment with a movable bridge. The roadway profile of Bridge Street would remain unchanged. The total bridge length is approximately 400 feet with a movable span length of approximately 120 feet. The number of waterway channels would be reduced from two (2) 80-foot channels to one (1) 80-foot channel. Movable bridge types investigated for this concept were single leaf bascule spans; and tower, pylon and table-top vertical lift bridges. The adjacent fixed spans would be composed of standard steel or pre-stressed concrete girders.

The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the

bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

West of the river, minor ROW impacts are anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. East of the river, minor ROW impacts are anticipated at the Speedway gas station as well as the proposed apartment/condominium property (1 Harrison Ave). A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

Of the movable type bridges investigated, a single leaf bascule bridge is the preferred structure type by both Hudson and Essex County based on maintenance and operation considerations. Concept 6A accommodates current and future users of the Passaic River. Additionally, based on recent discussions with the USCG, maintaining a single 80' channel width with a single leaf bascule span is acceptable to the USCG for future navigation of the river. The bascule span can provide unlimited vertical clearance in the open position.

Concept 6B – Bridge on Existing Alignment, Movable Bridge with One (1) 100-Foot Waterway Channel

Concept 6A includes widening and replacement of the Bridge Street Bridge along the existing alignment with a movable bridge. The roadway profile of Bridge Street would remain unchanged. The total bridge length is approximately 400 feet with a movable span length of approximately 150 feet. The number of waterway channels would be reduced from two (2) 80-foot channels to one (1) 100-foot channel. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

West of the river, minor ROW impacts are anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. East of the river, minor ROW impacts are anticipated at the Speedway gas station as well as

the proposed apartment/condominium property (1 Harrison Ave). A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

Concept 6C – Bridge on Existing Alignment, Movable Bridge with Two (2) 80-Foot Waterway Channels

Concept 6A includes widening and replacement of the Bridge Street Bridge along the existing alignment with a movable bridge. The roadway profile of Bridge Street would remain unchanged. The total bridge length is approximately 400 feet with a movable span length of approximately 240 feet. The number of waterway channels would remain unchanged. The proposed structure width is approximately 80 feet which includes the following: 6-foot sidewalks and 2-foot concrete barriers along both sides of the bridge, two 12-foot eastbound lanes, two 12-foot westbound lanes, and 8-foot outside shoulders in both directions.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

West of the river, minor ROW impacts are anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. East of the river, minor ROW impacts are anticipated at the Speedway gas station as well as the proposed apartment/condominium property (1 Harrison Ave). A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

Concept 6D – Movable Bridge on Existing Profile and Alignment with 1 Waterway Channel and Auxiliary (Maintenance) Channel

Concept 6D includes widening and replacement and replacement of the Bridge Street Bridge along the existing alignment. The proposed structure would be a movable bridge on the existing profile that provides USACE access to maintain the full 200' federally authorized channel width at this location.

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Movable bridge types investigated for this concept were double leaf bascule spans; tower, pylon and table top vertical lift bridges spanning the full 200' width; and swing spans similar as the existing bridge. It was concluded that the preferred structure would be an unequal length (bobtail) swing bridge on the existing profile; with both Counties long-term familiarity and knowledge for operating and maintaining swing spans as opposed to other movable bridge span types.

The total bridge length is approximately 400 feet, with an approximate 258-foot long unequal length (bobtail) swing span. The adjacent fixed spans would be composed of standard steel or pre-stressed concrete girders. The structure of the swing span will be of deck girder, through girder or through truss configuration as determined by additional study in the Preliminary Engineering Phase.

The fore span of the swing bridge (roughly 150.5 feet in length) would span over the western existing 80-foot wide waterway channel under the Bridge Street Bridge. The back span of the bobtail swing (roughly 107.5 feet in length) would span over a portion of the existing eastern channel. Due to the bridge widening and in order to maintain the existing 80-foot width western channel, the pivot of the swing span will be shifted to the east by approximately 20 feet from that of the existing bridge. This shift and the added width of the bridge requires an increase in the width of the central fender to approximately 85 feet. Considering the navigation channel width of 200 feet with the widened center fendering, the eastern channel will reduce to a navigation clearance of approximately 58 feet. While this channel will also provide unlimited vertical clearance in the span open condition, this channel will be deemed a maintenance channel to permit future maintenance of the waterway through dredging.

The existing angle point between Bridge Street and the eastern side of the bridge is eliminated; a new horizontal curve with a 2170-foot radius is proposed along Bridge Street. East of the bridge, the Bridge Street and Passaic Avenue intersection is modified to lengthen the Bridge Street eastbound left turn lane and provide a lane width of 12 feet. Additionally, the Bridge Street/Harrison Avenue westbound approach is modified to include one (1) through lane and one (1) shared through/right turn lane. The second westbound through lane will extend through the intersection and over the bridge. Lane widths are increased to provide 12-foot lanes on the eastbound and westbound Bridge Street approaches. The intersection will be updated to include ADA-compatible curb ramps and detectable warning surfaces, pedestrian countdown heads and pushbuttons, and crosswalks. The proposed sidewalks on the bridge will be extended to meet the existing sidewalks along Bridge Street and Passaic Avenue. West of the bridge, the Bridge Street westbound approach to the McCarter Highway intersection will be widened to include one (1) exclusive left turn lane, one (1) shared left turn/through lane and one (1) shared through/right turn lane.

West of the river, minor ROW impacts are anticipated at the Lukoil gas station and Mr. Adams Steakhouse properties. East of the river, minor ROW impacts are anticipated at the Speedway gas station as well as the proposed apartment/condominium property (1 Harrison Ave). A small section of the Harrison Waterfront Walkway would also be impacted and require modification.

Since the proposed bridge is along the alignment of the existing bridge, a detour or temporary bridge will be required to maintain traffic during construction since the demolition of the existing bridge cannot be staged.

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Concept 6D meets the Project Purpose and Need. This alternative provides unlimited vertical clearance and 75-ft horizontal clearance for the existing western navigation channel for all waterway users; as well as unlimited vertical clearance and sufficient horizontal clearance for future maintenance of the eastern channel, as anticipated to be required by the USACE upon completion of Section 408 coordination. Concept 6D proposes a swing bridge at this location, which is the preferred movable bridge span type for Hudson and Essex Counties. There are also minimal Right of Way and environmental impacts associated with this alternative.

Concept 7 – New Location, Bridge on North Alignment, Fixed Bridge with 12-Foot Vertical Clearance

Concept 7 includes widening and replacement of the Bridge Street Bridge along an alignment north of the existing alignment. The new bridge would be a low-level fixed span bridge providing 12 feet of vertical clearance over the Passaic River, and the existing Bridge Street Bridge would remain in place. The new bridge would run parallel to Bridge Street and align with Cleveland Avenue to the north. The total bridge length is approximately 400 feet and would include two (2) 12-foot eastbound lanes, two (2) 12-foot westbound lanes, 8-foot outside shoulders and 6-foot sidewalks in each direction. Two (2) new signalized intersections are proposed at McCarter Highway/Cleveland Avenue and Passaic Avenue/Cleveland Avenue. This option would also require widening of Passaic Avenue to two (2) lanes in each direction between Bridge Street and Cleveland Avenue.

West of the river, the new bridge alignment would require the demolition of the Newark Waterfront Center. East of the river, the new bridge alignment would require partial (if not full) demolition of the Hampton Inn & Suites Hotel.

Since the proposed bridge is located north of the existing bridge alignment, the existing Bridge Street Bridge can be used to maintain traffic during construction of the new bridge.

Concept 8 – New Location, Bridge on South Alignment, Fixed Bridge with 12-Foot Vertical Clearance

Concept 8 includes widening and replacement of the Bridge Street Bridge along an alignment south of the existing alignment. The new bridge would be a low-level fixed span bridge providing 12 feet of vertical clearance over the Passaic River, and the existing Bridge Street Bridge would remain in place. The new bridge would run parallel to Bridge Street and align with Bergen Street to the south. The total bridge length is approximately 400 feet and would include two (2) 12-foot eastbound lanes, two (2) 12-foot westbound lanes, 8-foot outside shoulders and 6-foot sidewalks in each direction. West of the river, the existing northbound jughandle at Lombardy Street would be closed and the new bridge would align with Lombardy Street. The signalized intersection at McCarter Highway and Lombardy Street would be modified to accommodate the new bridge alignment. Additionally, a new signalized intersection is proposed at S. 1st Street and Bergen Street. Widening of both Bergen Street and S. 1st Street to two (2) lanes in each direction would be required, and on-street parking on both streets would be eliminated.

West of the river, the new bridge alignment would require elimination the jughandle at Lombardy Street. East of the river, the new bridge alignment will impact the Water's Edge at Harrison luxury apartments and could potentially require partial demolition of buildings. Additionally, the new alignment would impact the Harrison Waterfront Walkway in the vicinity of the Water's Edge at Harrison apartments.

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Since the proposed bridge is located south of the existing bridge alignment, the existing Bridge Street Bridge can be used to maintain traffic during construction of the new bridge.